

### **ABSTRACT**

The present invention relates generally to the treatment of SCI by stimulating axon regeneration within the central nerve system. One aspect of the present invention provides methods of treating SCI with low power laser irradiation (LPLI). Another aspect of the present invention provides methods of treating SCI by modulating a gene activity to stimulate axon regeneration. In this regard, the present invention also provides compositions that modulate genes expression relating to the neuron- regeneration after SCI. Another aspect of the present invention provides methods for evaluating the effectiveness of a treatment for SCI.